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MAJOR CROP PROGRESS AND WEATHER REPORTING

GRAIN HARVEST PROGRESS IN SOUTHERN KAZAKHSTAN

[Editorial Report] Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 19 Jul 80 p 1 reports enterprises in Lengerskiy Rayon, Chimkentskaya Oblast, began harvesting a little later than others, since it is situated in the piedmont zone.

Moscow SEL'SKAYA ZHIZN' in Russian 13 Jul 80 p 1 reports more than 250,000 tons of grain have been delivered to procurement points in Chimkent'skaya Oblast. Seven rayons are sending above plan grain to the state. Harvest units have left the fields of Chardarinskiy, Kelesskiy and Saryagachskiy rayons and by night when the daytime heat decreases move north with their support units to the piedmont fields of Algabasskiy, Sayramskiy and Tyul'-kubasskiy rayons. Algabasskiy Rayon is thrashing 14 quintals of grain per hectare. A little more than half the grain is cut here.

The days in southern Kazakhstan have been unusually hot. The air is white hot, the thermometer does not drop below 42-43 degrees in the shade. Equipment operators in Chimkentskaya Oblast must work under adverse conditions. But the determination on the grain fields has not slackened for an hour. Agricultural workers in the Oblast began harvesting a week later than last year. But skillful organization of all links of the harvest conveyer allowed them to attain a higher pace from the very first days and everywhere work according to the established schedule. Grain has been cut and thrashed on 85,000 hectares more than last year.

Moscow PRAVDA in Russian 27 Jul 80 p 1 notes it is hot now on the fields of Dzhambul'skaya Oblast. The harvest campaign is in full swing. Of the more than 600,000 hectares sown to grains in the oblast, over 400,000 hectares have been harvested.

Tselinograd FREUNDSCHAFT in German 22 Jul 80 p 1 reports in Alma-Atinskaya Oblast wheat and barley are growing on 522,000 hectares. Agricultural workers will sell 250,000 tons of grain to the state.

Alma-Ata KAZAKHSTANSKAYA PRAVDA in Russian 11 Jun 80 p 2 reports Taldy-Kurganskaya Oblast will sell 449,000 tons grain to the state.

Tselinograd FREUNDSCHAFT in German 23 Jul 80 p 1 notes in spite of unstable weather conditions in the days of the spring sowing agricultural workers in Kazakhstan have established a firm base for the harvest. Spring crops were sown over the entire area of almost 29 million hectares with the best agro-technical dates. They have brought out more mineral fertilizer than they did last year.

In Chimkentskaya Oblast the grain harvest is already coming to an end. They are cutting grain in Dzhambul'skaya, Alma-Atinskaya and Taldy-Kurganskaya Oblasts. In Alga-Basskiy Rayon, Chimkentskaya Oblast, they are getting 12 quintals grain per hectare vis-a-vis the planned 10.3 quintals per hectare. In Tyul'kubasskiy Rayon they are getting 20.2 quintals grain per hectare, significantly more than last year.

The gathering of the harvest has also begun in Ural'skaya Oblast.

Moscow PRAVDA in Russian 25 Jul 80 p 1 and Moscow TRUD in Russian 25 Jul 80 p 1 report the boundaries of the harvest are moving out in Kazakhstan. Following enterprises in the southern zone kolkhozes and sovkhoses in Ural'skaya Oblast began harvesting today. The grain area here exceeds 1,500,000 hectares. All combines are reequipped to cut low, their hermetic seals have been checked out.

CSO: 1824

MAJOR CROP PROGRESS AND WEATHER REPORTING

GRAIN HARVEST NOTES FROM UKRAINE, NORTH CAUCASUS

[Editorial Report] Moscow SEL'SKAYA ZHIZN' in Russian 25 Jul 80 p 1, and Kiev SIL'S'KI VISTI in Ukrainian 15 Jul 80 p 2 report the harvest has come to the fields of Kirovogradskaya Oblast. Two or 3 days ago enterprises only in the southern rayons--Ustinovskiy, Bobrinetskiy and Dolinskiy--were harvesting selectively. But today the boundary of large scale cutting of grain has moved to the northernmost rayons--Onufriyevskiy and Svetlovodskiy. Grain growers in Kirovogradskaya Oblast will harvest 3,140,000 tons and sell 1,469,000 tons of grain to the state.

Kiev PRAVDA UKRAINY in Russian 20 Jul 80 p 2 notes that in Odesskaya Oblast the first strong and durum wheat has arrived at the elevators from the southern rayons. Agricultural workers in Odesskaya Oblast will sell 100,000 tons strong and 500,000 tons valuable wheat to the state, twice the plan.

The Moscow SEL'SKAYA ZHIZN' in Russian 27 Jun 80 p 1 article is of interest in light of a late June report from Ovidiopol'skiy Rayon, Odesskaya Oblast, in which the rayon grain sales figure was projected at 52,000 tons vis-a-vis a plan figure of 27,000 tons.

In Kiev PRAVDA UKRAINY in Russian 15 Jul 80 p 2 indicates agricultural workers in Poltavskaya Oblast have additionally equipped 800 cultivators with special ridgers. Such working organs not only improve aeration in soil water logged due to frequent rains but also obviate the need for subsequent hand weeding of crops.

Moscow TRUD in Russian 26 Jul 80 p 1 reports enterprises in Khasavyurtovskiy Rayon, the primary granary of Daghestan, completed the harvest of winter grains yesterday.

Moscow SEL'SKAYA ZHIZN' in Russian 26 Jul 80 p 1 and Moscow TRUD in Russian 26 Jul 80 p 1 reports in Stavropol'skiy Kray the heightening pace of grain sales to the state is reflected in the kray's receipt of credit for sale of its millionth ton of grain to the state. Filling of grains in many places in Stavropol'skiy Kray this year coincided with a prolonged heat wave, which did not allow the spikes to develop fully. But in the main kolkhozes and sovkhozes are gathering a good harvest from every hectare. A high level of cropping still is the guarantee. A weighty crop has grown up in Petrovskiy, Ipatovskiy, Apanasenkovskiy, Turkmenskiy and other rayons.

Moscow TRUD in Russian 18 Jul 80 p 1 reports that in Levokumskiy Rayon, Stavropol'skiy Kray, they completed the thrashing of winter and spring grains on the entire area of 67,000 hectares yesterday.

Moscow IZVESTIYA in Russian 18 Jul 80 p 1 notes in Krasnodarskiy Kray as of the morning of 16 July three-fourths of all grains and pulses were cut and half of this amount thrashed. The first quarter million tons of grain have been delivered to the granaries.

Moscow TRUD in Russian 26 Jul 80 p 1 and Moscow IZVESTIYA in Russian 27 Jul 80 p 1 report in Krasnodarskiy Kray the harvest of winter grains [kolosovyye] and pulses was completed yesterday on an area equal to almost 2,000,000 hectares. Despite adverse weather conditions agricultural workers in Krasnodarskiy Kray were able to grow and gather a good harvest of more than 30 quintals of grain per hectare. The second million ton of grain, primarily strong and valuable wheat is arriving at the granaries.

Moscow SEL'SKAYA ZHIZN' in Russian 25 Jul 80 p 1 notes agricultural workers in Rostovskaya Oblast have sent a million tons of grain from the new harvest to the state granaries. The grain flow grows with every day. Workers in Yegorlykskiy, Peschanokopskiy and Bagayevskiy rayons have already reported finishing the harvest of early grains.

Moscow TRUD in Russian 17 Jul 80 p 1 notes all 40 rayons in Rostovskaya Oblast have begun harvesting. The weather again put together a stern exam for the grain growers: after the prolonged cold spring hot winds sudden blew bringing pouring rains and hail. The wheat and especially the barley lodged over large stretches. Despite the difficulties which have cropped up grain growers here are full of resolve to harvest 9,000,000 tons of grain and sell as much as possible to the state.

Moscow PRAVDA in Russian 26 Jul 80 p 1 reports Stavropol'skiy Kray will harvest 4,600,000 tons grain, will sell 1,900,000 tons grain to the state.

CSO: 1824

MAJOR CROP PROGRESS AND WEATHER REPORTING

HARVEST NOTES FROM ARMENIA, GEORGIA

[Editorial Report] Moscow SEL'SKAYA ZHIZN' in Russian 15 July 1980 indicates the harvest is going forth under difficult weather condition in Signakhskiy Rayon Georgia. Despite the capricious weather--frequent downpours, hail and other natural calamities, the grain growers in the rayon reported more than fulfilling their five-year plan for grain sales to the State the other day.

Having successfully completed their five-year plan for grain sales to the State grain growers in Signakhskiy and Tsiteltskaroyevskiy rayons Georgia, they have begun sending convoys with above-plan grain to the elevators. An abundant grain crop [kolosvyay] has grown up on the fields of the local enterprises.

Moscow SEL'SKAYA ZHIZN' in Russian 24 July 1980 p 1 carries an article indicating grain harvesting and transport in Georgia is going strictly according to schedule. Leading enterprises in Georgia are planning to harvest the grain in 6 to 8 days and to significantly overfill their plans for grain sales to the State.

Yerevan KOMMUNIST in Russian 15 July 1980 p 1 reports at enterprises in rayons of the Ararat Valley and in the northeastern zone of Armenia the grain harvest has begun. According to data as of 7 July, 4,842 hectares had been cut, 11,070 tons of grain had been harvested. The average yield is 22.9 quintals of grain per hectare. Agricultural workers in Echmiadzinskiy Rayon have cut 816 of 1,642 hectares, the rayon yield is 33.5 quintals grain per hectare. Oktembyranskiy Rayon got 29 quintals of grain per hectare from 808 hectares. From 918 hectares Araratskiy Rayon's yield amounted to 27.3 quintals of grain per hectare.

CSO: 1824

POST HARVEST CROP PROCESSING

SHORTCOMINGS IN GRAIN ELEVATOR CONSTRUCTION DISCUSSED

Moscow STROITEL'NAYA GAZETA in Russian 11 Jun 80 p 1

[Article: "Elevators for the Harvest"]

[Text] The state allocates vast funds for the construction of elevators. This is understandable: A reliable base for the processing and storage of crop output plays an important role in the attainment of the final result of agricultural production.

As during past years, advanced collectives of elevator builders have now undertaken obligations and timed the commissioning of grain storage facilities with the beginning of the gathering of the new harvest. It is difficult to overestimate the significance of this initiative: The specific sections of work where with small expenditures it is possible to obtain the maximum final result--to deliver new capacities to the client on a "turnkey" basis--have been determined.

Everyday working life gives many examples of innovation and creative initiative on the part of the participants in construction. For a number of years the personnel of the Yuzhelevatormel'stroy Trust has worked stably and delivered elevators on and ahead of schedule. This year the personnel's main concern is to hand over storage facilities to grain growers by the beginning of harvesting. While the half-year plan calls for 31,800 tons, elevators of a total capacity of 73,600 tons have been put into operation in 5 months.

The competition is continuing. Cooperation of clients and planners with Kazakhstan's elevator builders has become traditional. For example, in the construction of the Zholaman elevator it was decided to put the first stage for 62,000 tons of grain into operation by the beginning of harvesting. This project is unique. Many new structures are being introduced there and the first blocked building of auxiliary services in practice is being erected there. A well-planned town with all conveniences has been established for L. Vitkovskiy's enlarged overall brigade. With the help of the specialists of the client and the Yuzhelevatormel'stroy Trust and of the planners of Gishisredazpromzernoprojekt flow-line construction has been organized at the site and the brigade has contracted for the project and is confidently fulfilling obligations.

Other projects where, owing to their selfless labor, elevator builders are close to their goal can be mentioned. In particular, the builders of elevators of the RSFSR Ministry of Rural Construction in Nizhegol' in Belgorodskaya Oblast, Slavyansk in the Kuban' and Tarasovka in Rostovskaya Oblast and others manage their work successfully. During 4 months of this year the organizations of the USSR Ministry of Rural Construction put elevators of a total capacity of 244,000 tons into operation.

There are conditions for an acceleration of rates. Specialized elevator building organizations have been established and operate at the USSR Ministry of Rural Construction--the main contractor. The industrial base has been developed. With a proper production organization and complete deliveries of structures it makes it possible not only to reduce the labor expenditures at the site, but also to ensure stable production cycles of construction and an increase in its efficiency in the broadest sense. A wealth of practical experience has been accumulated. During 4 years of the five-year plan the USSR Ministry of Rural Construction put elevators of a total capacity of 13.4 million tons of grain into operation.

Unfortunately, at times these possibilities are not utilized efficiently and there are many such projects where the course of construction causes justified concern. Last year the RSFSR Ministry of Procurement and the RSFSR Ministry of Rural Construction did not ensure the commissioning of capacities at 19 elevators. This lag did not happen suddenly. During past years and this year more than once the builders and the client sat at a table, analyzed the reasons for disruptions and outlined measures to eliminate them, including the issue of joint orders of the republic's Ministry of Rural Construction and the Ministry of Procurement. However, they were not able to see to it that the plans and outlined measures became a firm basis for the organization of building production and labor of all elevator builders in the RSFSR. Material-technical and labor resources are not concentrated at start-up construction projects everywhere. For example, elevator capacities at the 20th crossing in Orenburgskaya Oblast were not put into operation last year. It seemed that this year the Orenburgelevatorstroy Trust would concentrate forces there and ensure the most rapid commissioning. However, work was not done on many projects of the complex in January-April. The percentage of plan fulfillment is also low at the sites of a number of other start-up elevators not commissioned last year.

The situation at the projects first included in this year's start-up program is even more alarming. Construction sites are not fully staffed and in a number of places work is done in a selective manner. For example, in the construction of the elevator in Yefremov in Tul'skaya Oblast the Tsentrelevatorstroy Trust has not yet begun working on one-half of the start-up projects of the complex. In 4 months a total of 439,000 rubles out of the 1.8 million rubles' worth of construction and installation work planned for the year have been utilized, including only 83,000 at the start-up complex.

The rate of elevator construction is a complex process requiring a high level of work organization in all units. The situation formed in elevator construction in the RSFSR indicates that the conveyor fails, because the necessary interaction has not been set up among its units. There are many shortcomings in planning--most projects are to be delivered at the end of the year. For example, this year the USSR Ministry of Rural Construction is to put elevators of a total capacity of 3.3 million tons of grain into operation. During the first half-year the plan envisages the commissioning of capacities of only 704,800 tons. According to the norms the construction of a large elevator is designed for several years. This means that the construction process is of a continuous nature, while planning, noncontinuous, only annual. The USSR Ministry of Procurement as the client should be interested in the solution of the plan problem. For many years elevator builders have demanded from the client the introduction of 2-year planning--the Orel continuous planning method--but they have not been successful.

Now, when the first half-year is approaching the end, in all collectives of elevator builders it is necessary to check how socialist obligations are being fulfilled. Those that have been unable to attain a high rate of work should be helped to adopt the experience of the best and to see to it that every work hour is fully devoted to this matter.

At the conclusion of construction, installation and finishing work characteristic of start-up elevators scheduled for commissioning during the harvest period it is especially important to create all the conditions for a new advance of socialist competition. It is necessary to utilize the entire arsenal of organizational and technical measures, advanced experience and moral and material incentives for this. Economic managers and party and trade union organizations of construction projects must manifest daily concern for the development of the labor activity of elevator builders. This is one of the decisive conditions for the fulfillment of the plans and obligations for the commissioning of elevators of the concluding year and the five-year plan as a whole.

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CSO: 1824

POST HARVEST CROP PROCESSING

BRIEFS

GRAIN ELEVATORS—The grain of the new harvest is arriving at the country's bins. "More than 1,800 grain receiving and processing enterprises are ready for acceptance," A. Yukish, chief of the Main Administration of Elevator Industry of the USSR Ministry of Procurement told a TASS correspondent. Repair brigades in almost all the country's regions entering the harvest period worked ahead of schedule. Elevators are the most effective storage facilities. During the last harvest period they received and processed up to 7 million tons of grain in 24 hours. Their capabilities are now being increased considerably. Additional capacities exceeding 1 million tons are being put into operation. Large elevators have been built in Kazakhstan, Siberia, the Ukraine and other places. [Text] [Moscow TRUD in Russian 8 Jul 80 p 1/ 11,439]

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LIVESTOCK

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BETTER USE OF LOW FAT MILK, BUTTERMILK, WHEY URGED

Moscow MOLOCHNAYA PROMYSHLENNOST' in Russian No 6, Jun 80 pp 1-4

[Article by A. G. Yaitskikh, USSR Gosplan: "Improve the Use of Low Fat Milk, Buttermilk, and Whey"]

[Text] In line with the resolutions of the 25th CPSU Congress, the dairy industry faces the challenge of making fuller use of agricultural raw material and the useful substances contained in it to produce full-value food products. This is becoming especially urgent in connection with the scarcity of animal protein in the public diet. The document "Basic Directions of Development of the USSR National Economy in 1976-1980" also envisions a significant expansion of the production of dry low fat milk and whole milk substitutes.

One of the basic reserves for increasing the production of food products and feed for animal husbandry is low fat milk, buttermilk, and whey obtained when processing milk.

With the growing volume of production of animal fat in industry the resources of this raw material increase each year. In 1978 36.2 million tons of low fat milk and buttermilk and 9.8 million tons of whey was obtained from milk processing, an increase of 1.5 times and 1.6 times respectively over 1970. According to plans for volume of production of dairy products in 1980 resources of low fat milk and buttermilk will be 37.5 million tons and there will be 12.1 million tons of whey.

Growth in the production of whole milk products, especially new types with higher milk protein content and increase in the production of non-fat dairy products in recent years made it possible in 1980 to envision using 13.5 tons of low fat milk and buttermilk for food purposes as compared to 5.2 million tons in 1970.

The planning and construction of new city dairy plants and reconstruction of existing enterprises today envisions the development of

special capacities to produce a broad assortment of nonfat milk products and supply them to the population in conformity with physiologic norms recommended by the Institute of Nutrition of the Academy of Medical Sciences USSR.

Scientific research organizations of the USSR Ministry of Meat and Dairy Industry have developed normative technical documents for more than 30 types of low fat and nonfat dairy products, most of which have been put into production.

All of these steps will make it possible in 1980 to raise the production of nonfat dairy products to 3 million tons converted to low fat milk, that is to produce 18 kilograms a year per capita of the city population compared to 10.5 kilograms in 1975. The USSR Ministry of Meat and Dairy Industry is also taking steps to expand the production of low fat dairy products with fruit and berry filling.

The production of dry low fat milk and whole milk substitutes has continued to develop in the 10th Five-Year Plan.

For practical purposes, industrial incorporation of this output was begun in 1971 for the purpose of releasing the whole milk used to feed young farm animals.

During this period the All-Union Scientific Research Institute of Dairy Industry and the All-Union Institute of Animal Husbandry, with other scientific research organizations, have worked out a number of new types of substitutes that have high feed value, including ZTsM-2 [whole milk substitute], regenerated milk, and BIO-ZTsM.

During the current five-year plan the dairy industry has begun production of new types of milk protein concentrates: caseinates, caseinates, and coprecipitates. At the present time specialized shops to produce sodium caseinates with a total capacity of 12,000 tons a year are under construction. When they are launched in 1980 the production of caseinates will rise to 15,000 tons.

Steps are also being taken to improve the use of milk whey. At most enterprises the whey obtained during the manufacture of natural cheeses and curds is separated and the milk fat goes for the production of animal fat and other dairy products.

An increase in the capacity for production of milk sugar made it possible to completely satisfy the national economy's need for this product. 1980 production of milk sugar is planned to be 18,000 tons.

In recent years industry has accumulated practical experience in the production of various concentrates made from milk whey, including dry

and condensed forms. This makes it possible to use all the components fully. Dry whey is used in the production of processed cheese, ice cream, bread and pastry, and feed concentrates, including whole milk substitutes. The use of condensed milk whey in baking, the candy industry, and production of mixed feeds is promising.

Steps are being taken to supply new equipment to existing whey processing shops at cheese plants and city dairy plants. At the present time, plans for cheese making and city dairy plants envision shops whose capacities will permit full industrial processing of milk whey and production of the corresponding output. For example, when industrial processing of whey is organized at a cheese making plant with a capacity of five tons of cheese a shift it is possible to produce additional output worth 700,000 rubles a year.

Natural milk whey is widely used in baking. In 1980 1.8 million tons of whey is to be supplied for bread baking, which is 1.4 million tons or 4.5 times more than in 1975.

Nonetheless, the level of industrial processing of low fat milk, buttermilk, and whey continues to be low and the bulk of this valuable raw material is used for livestock feed.

Analysis shows that in the summer and fall industry and agriculture have surpluses of this raw material, but in the winter and spring there is a shortage.

It should be observed that uneven supply of low fat milk and whey to the kolkhoses and sovkhoses and their lack of necessary equipment and conditions for storing it, especially in the summer, lead to a decrease in its nutritional properties and significant losses.

The low level of use of low fat milk, buttermilk, and whey to produce food products, dry low fat milk, and whole milk substitutes is linked to a shortage of industrial capacities and also to high norms for returning low fat milk to the farms.

In the coming years the significantly increased volumes of state milk purchases and production of dairy products will bring about a corresponding increase in resources of low fat milk, buttermilk, and whey. In 1985 more than 43 million tons of low fat milk and buttermilk and almost 16 million tons of whey will be received.

Given the growing public need for milk protein and agriculture's increasing demand for full-value protein feeds, the use of this raw material to raise calves is inefficient for the national economy compared to using it for making whole milk substitutes and starter mixed feeds based on dry low fat milk and dry whey.

The CPSU Central Committee and USSR Council of Ministers have reviewed the question of further improvement in the use of low fat milk, buttermilk, and whey in the dairy industry and increasing production of dairy output to supply food to the population and protein feed for animal husbandry. They adopted an appropriate decree on this matter.

The decree outlines major steps to insure rational use of milk purchased by the state. It envisions increasing the industrial processing of low fat milk and buttermilk from 14 million tons in 1978 to 25 million tons in 1985 and increasing processing figures for milk whey from two to 11 million tons. On this basis there will be a significant increase in the volume of production of nonfat and low fat dairy products and of feed for animal husbandry.

The 11th Five-Year Plan envisions a comprehensive system of steps which includes, in addition to developing the production-technical base of the dairy industry, improving the production and delivery of special production equipment, processed materials, and specialized motor vehicle transportation. Whereas the introduction of production capacities for dry low fat milk, whole milk substitutes, and dry whey will be about 400 tons a shift in the current five-year plan, it will be almost three times larger in 1981-1985. About 1.1 billion rubles of capital investment will be used in the 11th Five-Year Plan to create these capacities. This is 3.1 times as much investment as in 1976-1980.

The growth in production of these products will make it possible to improve the supply of valuable protein products to sectors of the food industry and animal husbandry complexes during the fall and winter. Moreover, it will promote environmental protection and more rational shipping.

Plans call for expanding the production of nonfat dairy products to a level that makes it possible to bring consumption of such products to the norm recommended by the Institute of Nutrition of the Academy of Medical Sciences USSR.

The production of condensed and enriched whey for animal husbandry needs will rise significantly.

Supplying special equipment to industry for condensing and drying secondary raw material has an important place in the system of measures to increase industrial processing of such raw material. In this connection, machine building is expected to organize series production vacuum evaporators with capacities of 2,000, 4,000, and 8,000 kilograms of evaporated moisture an hour, spray-type driers capable of removing 1,000 kilograms of evaporated moisture an hour, ultra-filtration units to process milk whey and low fat milk, centrifuges and driers for milk sugar, and other pieces of equipment.

During 1981-1985 industry is to deliver a total of 220 spray-type driers with productivity levels of 300-2,000 kilograms of evaporated moisture an hour, about 600 vacuum evaporators capable of 1,000-16,000 kilograms of evaporated moisture an hour, 3,000 cream separators with productivity of 10,000 liters an hour, and 750 separators to remove protein from whey. Enterprises of the Ministry of Machine Building for Light and Food Industry and Household Appliances are expected to begin producing and deliver new types of equipment for the dairy industry, including centrifuges and driers for milk sugar, separators with automatic residue removal and productivity levels of 25,000 liters an hour, and ultrafiltration devices to process 5,000 liters of milk whey an hour.

Plans envision construction of specialized plants to produce dry low fat milk and whole milk substitutes with sets of equipment capable of producing up to 12 tons per shift. Steps are to be taken to re-equip existing enterprises and organize shops for full processing of secondary raw material.

To increase the production of low fat dairy products, confectionary goods, and other food products using dry low fat milk in the Union republics that do not produce this raw material, plans call for the formation of a national fund of this product by deducting 10 percent of the annual volume of its production in other Union republics.

As capacities for production of dry low fat milk and whole milk substitutes are enlarged, the enterprises of the dairy industry should make a gradual transition to supplying kolkhozes, sovkhoses, and other farms whole milk substitutes for raising young farm animals for use in place of the low fat milk returned to the farms according to established norms.

In order to achieve rational use of low fat milk whey fed to livestock, as of 1 January 1981 the price for milk whey delivered to farms will be set at three rubles a ton.

The ministries of meat and dairy industry, associations, and enterprises must do a great deal of work to raise the shift coefficient at existing enterprises and improve the use of their production capacities. It is important to insure that new enterprises have workers when needed. In this connection, the necessary capital investment is envisioned for housing and cultural-domestic construction to benefit the employees at newly constructed enterprises for processing secondary raw material.

In recent years production cooperation in building capacities to produce dry low fat milk and whole milk substitutes has developed on the basis of building interfarm shops using agricultural capital. It is recommended that this practice be expanded.

Accelerating scientific-technical progress and introducing scientific advances and progressive practices in industry are very important for a further increase in production, improvement in quality, expansion in assortment, and increase in the economic efficiency of producing dairy products from low fat milk, buttermilk, and whey. The USSR State Committee for Science and Technology is commissioned in the plan of scientific research and experimental design work for 1981-1985 to work out the problem of comprehensive use of this raw material to produce new types of products and introduction of up-to-date technological processes and equipment for no-waste processing.

Persistent, planned work by employees of the dairy industry to solve this major national economic problem will be a new stage in the development of the production-technical base and will make it possible to raise production efficiency and provide further growth in the material well-being of the Soviet people.

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11,176
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LIVESTOCK

PROBLEMS IN LOCAL KAZAKH DAIRY INDUSTRY CITED

Karaganda ORTALIQ QAZAQSTAN in Kazakh 4 Jun 80 p 2

[Article by ORTALIQ QAZAQSTAN reporting team: M. Ebilqasova, sovkhos milkmaid, rayon Soviet deputy; R. Menzhiyev, sovkhos livestock unit mechanic; N. Inviya, non-staff reporter: "Many Meetings, Few Results"]

[Text] We made several visits to the livestock units on the Sovkhoz imeni Kuybyshev. The livestock overwintering situation and potential for boosting production were discussed at a meeting of the village Soviet in February. Comrade D. Tusipkhanov, chairman of the Zakharovka village Soviet, stated his unhappiness with the unacceptable situation in the sovkhos's dairy operation. Some time later we discussed the decline in milk production with Comrade Ghabit Mamrayev, the sovkhos party committee secretary. This situation was also discussed at a meeting of the party organization.

Sovkhoz management discussed on numerous occasions the matter of measures to improve the situation in the livestock operations.

So there have been discussions about this winter. Now the middle of summer is approaching. An official report has been published on the milk production and the procurement situation on the farms of this oblast for the first four months of the year. The Sovkhoz imeni Kuybyshev is at the very bottom in these two indices. Per-cow milk yield dropped by 45 kg in comparison with the same four-month period last year, and total milk procurement declined by 3 percent. While the per-cow milk yield achieved by this sovkhos is 2 kg below that of the Industrial'nyy Sovkhoz in the same rayon, it is 209 kg below that of the well-run Sovkhoz imeni Chkalov.

With attention focused on this situation, some improvement has resulted from conclusions reached from discussions at repeated meetings held since the beginning of the year on this sovkhos by the village Soviet, party committee and sovkhos management. Just what is the result of these months of discussion?

Usually little would be accomplished at meetings other than scowling and mutual recriminations. The subdivisions and livestock units keep issuing

written resolutions that people must show greater responsibility in their work and must display greater initiative.

Here lies the heart of the problem -- these written resolutions remain mere words on paper, and exhortations to get the job done are ignored. Throughout the winter the sovkhos feed preparation shop stood idle. One might inquire why this shop did not go into operation, a shop which is capable of improving the performance figures of the large sovkhos livestock operation. At meetings the sovkhos's top officials engage in a shouting match, vacillate on what measures should be taken, and make excuses to absolve themselves from blame before the community. In the second place, it takes a certain amount of time to improve milking operations in the dairy units. We took a look at the situation during the winter and spring, inspecting the livestock units. Usually the milkmaids so hurriedly set up and wash off the milking machines that they do not really get them clean. On other sovkhoses, before proceeding with the milking, the milkmaids wash and massage the cow's udder and teats. We rarely see that practiced on this sovkhos. When the milk is transferred from tank to milk can, they do not run it through a cheesecloth filter. This also is a contributing factor to diminished purity and cleanliness of the product. We observed that in winter feed is distributed to the livestock by hand.

Rayon Soviet deputy Aldanysh Diyanova has worked to obtain better milkmaid performance. Last year her team produced more than 2.7 tons of milk per cow. This year they are striving to improve on this labor performance. They employ exemplary, progressive milking techniques. The sovkhos's livestock specialists, however, are not devoting adequate attention to application of the experience of these milkmaids to the entire herd. This is one of the reasons why there is such a lack of effectiveness here, as well as elsewhere, in establishing and following proper livestock operation procedures. Arriving milk truck drivers pay absolutely no attention to the need to wash and keep clean the lines through which milk is run from the milk cans. Sometimes they run milk without washing out the lines. This worsening of the quality of their product is understandable. The comrades in the first production unit themselves specify the quality of the delivered milk as good. In actual fact, however, its butterfat content is low. Here milk from two production units is transported in one and the same truck. Therefore it is difficult to determine which production unit's milk is good quality, with high butterfat content.

Two lab technicians work at the milk delivery station. Unit animal specialist O. Sakimov, determining the quality of the unit's product on the basis of the first milk run into the truck by the lab technicians, is following the prescribed procedure. However, milk should be graded unacceptable on the basis of this legitimate requirement. The last time the butterfat content of the milk received from the first production unit was determined to be 2.8 percent. This is considerably below the standards. We were recently told the following by one of the specialists. The first unit's livestock complex is situated at the edge of the village of Zakharovka. In other words, it is only a stone's throw from the sovkhos

office. But the sovkhos livestock specialists do not devote time to verifying that milking operations at the dairy unit are following correct procedures.

Galina Tibayeva, a leading milkmaid, expressed regret about this state of affairs. The composition of the feed ration given to the dairy cattle is unsatisfactory. There are insufficient trace elements provided in the feed composition. This has an adverse effect on the butterfat content of the milk. To date no steps have been taken to correct the feed ration situation. It is also for this reason that some people purloin high-nutrient feed brought in for the dairy cattle. And even if any of these are known, the sovkhos does not bother to take administrative measures against them. Time and again the cows are not milked at the proper time. But positive actions are not taken against violations of labor discipline.

Milk from the sovkhos is hauled to the Kiyevka Dairy Plant. But the most important factor in this matter is lack of custodial responsibility. A seal is not placed on the tank of the trucks which bring in the milk. The people at the dairy plant also ignore this requirement. We once went to this plant to learn the procedure by which milk is received from the Sovkhos imeni Kuybyshev. The milk truck had to wait for two hours after arrival for the plant to accept delivery, because the driver had to wait in line for his turn, while Ol'ga Knaub, the plant's lab technician, took her sweet time about it. She poked a large dipper into the tank and took a milk sample.

"How much milk has to be taken to determine the quality of the product?" we asked her. "250 grams will do it." "But you just scooped out a good 5-6 kg." "Oh, we pour the rest into the rinse bucket."

"How many buckets of rinse do you use each day?" we asked the lab technician. "Oh, three or four buckets, I guess."

Take note that 3-4 buckets of milk are being poured out and wasted instead of being consumed as food. Is it right to waste in this manner milk brought in from the sovkhos, product for the benefit of the people, produced by the sweat of one's brow? An unnecessary waste. It would seem that the plant milk acceptance people and volunteer inspectors have had ample time to address this situation.

Summer is now with us, time for cattle to move to summer pasture. This is the best season for milk production. We would like to know what steps are being taken by the comrades of the Sovkhos imeni Kuybyshev to utilize the considerable potential available for boosting milk production. If they continue calling one meeting after another, engaging in shouting matches and writing lengthy resolutions, without verifying their implementation, if they do not take concrete initiative and work on improving organization of labor, their considerable potential for boosting milk production will remain uselessly wasted.

REGIONAL DEVELOPMENT

PROGRESS ON KARA-KUM CANAL REPORTED

Ashkhabad SEL'SKOYE KHOZYAYSTVO TURKMENISTANA in Russian No 2, Feb 80
pp 34-35

[Article by V. Malevich, Turkmen SSR Honored Irrigator, winner of TSSR State Prize: "The Fulfillment of a Popular Dream"]

[Text] Toward the end of December 1979, the workers of Turkmenistan triumphantly marked the 25th anniversary of the start of construction of Kara-Kum Canal imeni V.I. Lenin.

In connection with the 25th jubilee of Kara-Kum Canal imeni V.I. Lenin, General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet Comrade L.I. Brezhnev cordially saluted the collectives of construction workers, installation men and all workers and engineering and technical personnel who had taken part in the planning and construction of the canal, one of the largest irrigation structures in our country.

At the USSR Exhibition of National-Economic Achievements, an exhibit was organized of everything done by workers in the national economy within the zone of influence of Kara-Kum Canal. In the first half of December 1979, shortly before the triumphal ceremonies on the occasion of the 25th anniversary of the canal, a group of veteran hydro-construction workers who had gone the whole route of the canal from the Amudar'ya to Ashkhabad also met there with those who are continuing this route to the west, to the shores of the Caspian Sea.

Each of us recalled the recent past. We recalled the difficulties encountered along the whole route through the desert and how these were overcome by the courageous collective of hydro-construction workers.

All of us look back with fondness to 1954--the start of the crash work on the route of the canal from the Amudar'ya to Murgab and from Murgab to the Amudar'ya, working to meet each other. They were separated by a distance of 400 km. From the direction of the Amudar'ya, the detachment of hydro-construction workers used essentially a fleet of earth-removal equipment and

bulldozers, laying a pioneering trench before them. The hydro-construction workers brought the water with them. The detachment of hydro-construction workers coming toward them from Murgab was excavating the bed of the canal with excavators by means of the "dry" method. This is how the work of the first section of the canal was carried out. Prior to the start of the crash work on the route, major and complex preparatory work was done in researching and finding the most advantageous direction for the canal and in planning and establishing support points for the forthcoming construction operations. Subsequent sections of the canal were completed and continue to be done on the basis of the experience of the builders of the first section, basically using the same types of earth-moving equipment.

The further advancement of the canal westward is being combined with simultaneous increase of its throughput capacity throughout its entire length. The second section lengthens the canal by 138 km with consideration of water supply to the basin of the Tedzhen River. In 1960 the farms of the Tedzhen group of rayons were receiving Amudar'ya water.

In the construction of the third section of the canal, water reached the capital of our republic--Ashkhabad--on 12 May 1962. Completion of the construction of this section of the canal provided a supply of water as far as the settlement of Geok-Tepe. The length of the canal increased to 302 km and the annual flow to 8.3 billion cubic meters.

At the present time, the man-made river extends 1,002 kilometers. The age-old dream of the Turkmen people for a big body of water capable of transforming the desert has been fulfilled.

At the present time, major work is being done on the construction of a fourth section of the canal, extending it to Kazandzhik. As a result of the completion of the construction of the fourth section of the canal, the head expenditure of water from the river will reach 550 cubic meters per second and the annual discharge--up to 12.2 billion cubic meters per second. Amudar'ya water is now being received by farms of Bakhardenskiy Rayon, and farms of Kizyl-Arvatkiy Rayon and the city of Kizyl-Arvat have started to get it.

Let us turn to the data of hydrometeorologists. In the time from 1923 to 1978 inclusive, that is, of the 55 years 27 were acutely short of water and 11 years were practically without water. During those years, the farms of those rayons and basins where there was a shortage of moisture lost a large part of their crops, while crops in the basin of the Tedzhen River were completely destroyed by the drought.

The canal made it possible in the rayons reached by Amudar'ya water to sharply increase their irrigated areas and made it possible to introduce intrafarm steppe-grass fallow into agricultural turnover, to open up and to continue to open up virgin lands within the zone of the Kara-Kum Canal. In the operation of the canal since 1959, irrigation areas in its zone

have been increased from 160,000 to 450,000 hectares. There has been a corresponding increase in the production of agricultural products, including raw cotton.

In the struggle for continuing growth of production of raw cotton and other types of agricultural products, a big role will be played by the further extension of the canal to the west, to the virgin lands of Krasnovodskaya Oblast and the further opening up of new lands in Ashkhabadskaya and Maryyskaya oblasts. Of no less importance in the struggle for increased production, as before, is bound to be played by the modernization of the old irrigation network and a qualitative improvement of irrigated lands by means of capital planning and equipping of a collector-drainage network. And since we are speaking of the construction of a collector-drainage network, we cannot but help to refer to the lag in this matter. The sharp increase of a water supply to the old irrigated lands and the expansion of new irrigated areas with their copious humidification without the presence of drainage have brought about a sharp rise in the level of ground water, which has created the danger of excluding irrigated lands from agricultural turnover.

The adoption of emergency measures for improvement of the irrigated lands has basically stopped this danger, but it is far from eliminated.

In the near future, toward the end of the 1980s, the resources of the Amudar'ya River will be exhausted, and the resources from the use of the regulated flow of the Murgab and Tedzhen rivers will also be exhausted. Of unused local resources there only remains reduction of the losses of water in transportation. For this reason, the question has arisen of emergency modernization of existing irrigation networks for the purpose of boosting their efficiency to their rated value, and this will make it possible to increase the area of irrigated land approximately by 35-40 percent without an increase in water supply.

The time has come to express dissatisfaction with the hydro-construction workers who are planning and laying new irrigation canals of low efficiency and without lining them with antifiltration shielding. While this was tolerable in the past because of free (excess) river flow, at the present time such a thing is subject to categorical censure.

For these purposes, water-management organizations have adopted measures for the restructuring of their production bases--bases of the construction industry; the trade of the concrete layer is being developed; new plants for reinforced concrete products are being erected in Geok-Tepe, Chardzhou and such plants are planned in Charshanginskiy and Oktyabr'skiy rayons, the capacity of existing plants in Bezmein and Tedzhen is being built up, which makes it possible to go to the construction along the whole front of irrigation canals with concrete and reinforced facing and with high efficiency.

A rich body of experience was accumulated in the construction of the Karakum Canal. The fact is that for the first time in the world a canal has

desert for many hundreds of kilometers. This experience is being studied not only by the hydro-construction workers of our country but also by specialists of other countries and is being used in the laying of canals in similar conditions.

The time is quite close when the experiencing of building the Kara-Kum Canal will be needed in the construction of a canal for shifting the flow of Siberian rivers to the arid regions of Central Asia.

I would like to share my ideas and indicate the basic positions of the experience gained in the construction of the Kara-Kum Canal, consisting of the following:

--Conducting the water with one in the process of construction, making it possible to eliminate the time spent in filling the bed and soaking the canal when it is built with the "dry" method.

--Employment of the bulldozer not as an auxiliary mechanism in grading of the ground but as a basic earth-removing mechanism, permitting a doubling to quadrupling of the labor productivity of the operator compared to such mechanisms as the scraper, excavator and earth remover (zemsniyad), which were counted on in planning of the organization of construction work on the canal.

--Utilization of the energy of the water flow brought by the builders through the desert for the washing out of sand cuts. The relief of the area and the presence of water intakes along the route make it possible to use such a method. This measure speeded up by 1.5-2 years the arrival of Amudar'ya water to Murgab and reduced the cost of the construction work by several million rubles.

--The use of slightly inclining slopes in the upper reaches of earth dams and dikes that crumble, which also reduce construction costs and make it possible in such cases to eliminate such materials in short supply as metal and cement required for the reinforced concrete facing of steep slopes on the water side.

--The canal is planned and built for year-round operation. In the period when water is not required for irrigation, its discharge is used for filling intrasystem reservoirs, with their subsequent release for irrigation. This has made it possible to significantly reduce the cross section of the canal to the water reservoirs.

The prospects of development of irrigation farming within the impact zone of the Kara-Kum Canal are impressive. This puts major tasks before the hydro-construction workers. One would like to believe that the glorious collective of hydro-construction workers of our republic will fulfill with honor the tasks set before them.

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REGIONAL DEVELOPMENT

UTILIZATION OF WATER RESOURCES OF ATREK RIVER

Ashkhabad SEL'SKOYE KHOZYAYSTVO TURKMENISTANA in Russian No 4, Apr 80
pp 34-35

[Article by S.A. Ashirov, S.A. Atayev and V.A. Sokolova, senior scientific associate of Turkmen Scientific-Research Institute of Hydraulic Engineering and Land Reclamation]

[Text] The development of our republic's water economy makes big demands on the planning, construction and operation of water management installations. One of these requirements is the technical and economic validation of water-management measures. In order to get an idea of the degree of water provision of the republic's southwestern rayons, we took stock of this zone's water resources.

A primary source of irrigation in the desert and low-water zone is the utilization of river water through the construction of regulating structures and water reservoirs.

Atrek River is located in the southwestern part of Turkmen SSR. The river is 669 km long, 204 kilometers of which are on the territory of Turkmenistan. For a length of 129 km (between 79 and 204 km from the mouth) Atrek River serves as a state boundary of the USSR with Iran. The Atrek is the only river in Turkmenia whose waters discharge into the Caspian Sea, but only during the period of floods. The river is fed with snow and rain with early flooding characterized by the rapid drop of levels and discharges. Underground and returning water play a significant role in the feeding of the Atrek.

Atrek River, on reaching Gudriolum Mound, enters the Caspian lowland and its entire discharge at low-water level divides into two parts, one of which is diverted into Atrek Canal and the other--into an Iranian canal--Didar. Selevyye [translation unknown] and rain floods are frequently observed on the river. Thus, heavy rains falling in the basin of Atrek River in April 1976 caused an extraordinarily high rain flood. The river's water level rose sharply with a maximum water discharge of 1,400 cubic meters per second. In

view of the fact that water is drawn for irrigation along the entire river, available data on water discharges cannot be said to fully apply to the river regime. In consequence of intensive withdrawing of water from Atrek River and its tributaries in the upper reaches, beginning in March the bed of the river is dry throughout the entire length of the Meshad-Kuchan basin. The mean annual flow of Atrek River water at Kizyl-Atrek amounts to 8.64 cubic meters per second. The biggest discharges at Kizyl-Atrek Village in March exceed 120 cubic meters per second. A minimum discharge is observed in June-October. In some years the river dries up at Kizyl-Atrek.

Atrek River's water catchment area includes rocks that are easily washed out, with large-scale erosion being observed in downpours. The muddiness of the water on the average amounts to 18 kg per cubic meter. Maximal muddiness in some years reaches 70-100 kg per cubic meter.

Mineralization of Atrek River in the lower reaches changes within large limits. In the period of maximum discharges, it amounts to 1.4 gram per liter and in midsummer the maximum mineralization is over 12 grams per liter. During low mineralization the water has a sulfate-chloride-sodium-calcium content and during high mineralization--a chloride-sulfate content. According to the data of a reconnoitering study, Atrek River has many tributaries, but they are almost all outside the boundaries of the USSR.

In the summer season, the waters of the tributaries reach Atrek River's bed only in cases of flooding; the rest of the time they are siphoned off for irrigation. In Turkmenistan only one right tributary--the Sumbar--runs into Atrek River, as it has a constant flow. The area of the Sumbar basin within Turkmenistan is 7260 square kilometers, the length is 245 km, of which 28 km (between 217 and 245 km from the mouth) serve as the state boundary of the USSR with Iran. The Sumbar is fed by rains; its source is the confluence of two small rivers--the Deynes and the Kulun-Kalasa--that start in Iran with an average annual discharge of 1.18 cubic meters per second.

The Sumbar River reminds one of Atrek River as to its condition; below Kara-Kala Village, the water is used for irrigation, and the river remains without water for 2.5 months. The waters of the Sumbar are highly mineralized.

The Sumbar River receives numerous tributaries, consisting mostly of temporarily flowing rivulets fed by springs. The discharges of these rivulets are also used for irrigation, so that they do not reach the river bed. Sumbar River's biggest tributary is Chandry River (its length is 145 km and its total water catchment area is 1820 square kilometers), and it is fed on rains. The flow of Chandry River reaches the Sumbar in flood periods. Chandry River's tributaries are temporary rivulets. The average annual discharge of Atrek River is 9.30 cubic meters per second, that of Sumbar River--2.5 cubic meters per second and that of the Chandry--0.28 cubic meters per second.

The basin of Atrek River contains three venting reservoirs (Namedkul', De-lili and Kyzyl-Ay); their surface area amounts to 54.2 square kilometers, and the total useful volume is 29.7 million cubic meters.

For the purpose of increasing the water supply of the region, it will be necessary to regulate the flow through rebuilding old and constructing new reservoirs on Atrek and Sumbar rivers and engineering water conducting and water collecting structures.

Further development of irrigation farming and the opening up of new lands will proceed from the construction of Kara-Kum Canal. For the successful opening up of lands and boosting of agricultural production, it will be necessary to undertake correct, scientifically based land-improvement measures.

The present-day scale of irrigation within the bounds of the largest watering systems and basins of rivers has required of scientists a qualitatively new approach to problems of water distribution for more rational use of water resources. For this purpose there was created a scientifically based development for the use of underground waters in addition to surface waters for irrigation.

The prospects for using underground waters for agriculture are closely connected with general reserves, moduli of operational resources and debits of water collectors.

Confirmed reserves of underground waters in the basin of Atrek River amount to 170,170 cubic meters per second. The basin's underground waters are not being widely used because of their high mineral content. Gross removal of underground water amounts to 100,710 cubic meters per day. Mineralization of the underground waters belongs in chemical content to the sodium-chloride type, fluctuating between 3 and 10 grams per liter. They include very salty water with a mineralization of 20 to 50 grams per liter and contain brine of 50 grams per liter. This excludes use to supply water for sowings and construction purposes. The operational resources of the underground waters amount to 62 million cubic meters. Underground waters are to be found at a depth of 15-20 meters and in places up to 50 meters. The depth of underground water increases from west to east and reaches 50 meters in the region of the Chatsk land mass. A total of 74 operational wells are used in the basin of Atrek River. The underground waters are basically used for irrigation.

In the Kizyl-Atrek Basin, 8,296 hectares are irrigated and 624,543 hectares of land are flooded. Among the irrigated areas in this zone, there predominate grain crops--47 percent and fruit-and-berry plantings--23 percent of the total irrigated area. According to the data of the All-Union Giprovodkhoz Planning Institute by 1980 a total of 100,000 hectares of land will be flooded and 14,300 hectares will be irrigated.

With the development of irrigation, Kara-Kum Canal will be extended into the southwestern rayons of the republic. The construction of the canal in these rayons will make it possible to improve water availability to villages and cities and also to create a new cotton-raising region for the production of fine-fiber cotton. With the operation of the Kara-Kum Canal in Atrek's basin, it is planned to open up 300,000 hectares of land.

Full-scale water consumption in the basin of Atrek River comprises 1,267.45 million cubic meters and of this, irreversible losses amount to 465.09 million cubic meters and water removal--802.36 million cubic meters. The chief water consumers in the basin of Atrek River are agriculture--34 percent and industry--36 percent of total water consumption.

The water resources in the basin of Atrek River are limited; for this reason the main task is rational utilization of available irrigation water. This task may be fulfilled through maximum use of surface run-off and stocks of underground water. The creation of new irrigation systems equipped with modern equipment and the modernization of existing irrigation systems will increase the efficiency of the systems and reduce the amount of unreturnable water.

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AGRO-ECONOMICS AND ORGANIZATION

SOVKHOZ, PRIVATE ENTERPRISE CONFLICT IN DONETSKAYA OBLAST

Moscow TRUD in Russian 13 Feb 80 p 2

[Article by N. Mokrishchev (Donetskaya Oblast): "Lessons Drawn From One Experiment"]

[Text] It was April. Frosts were still occurring at night and yet the land was thawing out. Green grass was already appearing on the slopes in some areas. When the vehicle ascended a knoll, Viktor Arsen'yevich Chuchupalov saw a cow grazing in a pasture.

"So there you are!" he thought to himself, "the sovkhos herd is still in its winter stalls and here the first grass has made its appearance on the hillsides and the owner is already grazing his cow."

The director stepped down out of his vehicle and exchanged greetings with the "shepherd." It was P. Domanov, a driver for the sovkhos.

"Pavel Alekseyevich, what would be your reaction if a pair of sovkhos heifers were to graze alongside your cow? Would you tend them and see to it that they are properly fed?"

"How could this be?"

"We would sign an agreement with you. We would supply the feed in the winter. Once a heifer reached its delivery weight, you would return it to the sovkhos and be paid, at the state procurement price, for each kilogram of weight increase obtained."

Pavel Alekseyevich pondered the matter:

"Yes, it is possible. Although I do not have time to spare, nevertheless my wife and children could lend a hand."

We parted on this note.

"We are annually receiving 350-400 calves over and above the figure called for in the plan" thought Chuchupalov, "a new calf-house should be built for

them, but we do not have a contractor and no unengaged workers are available. Domanov could take two heifers and the others at least one apiece -- we could furnish more meat."

He returned to his office with these thoughts fresh on his mind. He summoned the party organizer P. Andryushan, the chairman of the workers' committee Ya. Sergiyenko and the chief specialists and the matter was later discussed during a meeting of the professional trade union and komsomol aktiv. Soon thereafter an appeal was addressed to the sovkhos workers and to all residents of settlements of the city of Kramatorsk, located on the territory of the farm, to conclude agreements with the Sovkhos imeni Ordzhonikidze for the raising of heifers on private plots.

The conditions are as follows: the sovkhos sells a heifer weighing up to 100 kilograms according to the procurement price of 123 rubles and 70 kopecks per quintal, it provides veterinary and zootechnical services and it furnishes hay, straw, silage and mixed feed in accordance with the state prices and norms. And when an animal reaches a weight of 350 or more kilograms, the sovkhos purchases the heifer at the rate of 123 rubles and 70 kopecks per quintal if it is in an average state of nourishment and at the rate of 146 rubles if in a higher state. Both the sale and purchasing back of the young stock are recorded in the form of documents.

Thus the experiment at the Sovkhos imeni Ordzhonikidze of the Slavyansk Trust of Vegetable and Dairy Sovkхозes was placed in operation.

"I purchased two heifers each weighing 70 kilograms and at the end of 11 months I delivered them weighing 390 kilograms and received 1,260 rubles" I was told by driver P. Domanov, "and the arrangement was profitable both to myself and to the sovkhos."

Roughly all of those who concluded agreements with the sovkhos offered the same opinion.

"And the farm did not suffer any losses." I asked the director.

Chuchupalov furnished a document. It revealed the following: during a period of less than 2 full years, 450 head of young stock, the average weight of which was 60 kilograms, were sold for raising on private plots. Subsequently, these same 450 head were sold to the state at an average weight of 360 kilograms -- 162 tons of beef. The feed expenditures of the sovkhos amounted to only 19,000 rubles. And the profit for each head of cattle, after squaring accounts with the workers, was 143 rubles.

Current plans call for geese to be raised on the private plots at the sovkhos and for no less than 250 tons of goose meat to be obtained during 1960.

Although the trust's specialists have displayed interest in the experiment and have approved its use, it is still not being employed extensively.

Moreover, the fear has been expressed that before long the entire undertaking may die away entirely.

The sovkhos leaders believe quite fairly that the meat furnished by individuals who signed agreements should be included in the sovkhos plan for the production and delivery of products to the state and that the privileges set forth in the 1970 decree of the CPSU Central Committee and the USSR Council of Ministers must be extended for these products. For example, the sovkhos must make an additional payment for young stock delivered weighing more than 350 kilograms -- a 10-15 percent bonus depending upon the weight. The specialists believe that this will generate greater interest among those who undertake to raise young stock.

But such practice is not in agreement with the instructions handed down by Gosbank. In the final analysis, everything is dependent upon the specific individuals responsible for evaluating the initiative displayed at the sovkhos. The Ministry of Sovkhozes for the Ukrainian SSR has informed the leaders of farms that a bonus can be added on to the procurement price based upon letter No. 9-3 55 of the USSR State Price Committee dated 12 February 1975, in which it is stated that sovkhozes can procure livestock from the population on the basis of prices agreed upon by the parties involved. But this letter is in conflict with methodological instructions No. 36 of the Ministry of Finances dated 16 April 1975, which states that bonuses are authorized for young large-horned cattle stock of raised weight procured from kolkhozes and sovkhozes, but not so authorized for young stock obtained from the population. The Kramatorsk branch of Gosbank is guided by this latter document.

Thus, on the one hand we have clever initiative and concern on the part of people for ensuring that the country obtains greater quantities of meat. Moreover, this concern is of an unselfish nature, since we are speaking here of above-plan output, for which the leaders of a sovkhos are not held responsible. For the same wages, the board of directors undertook an additional burden -- the sovkhos has more than enough problems with regard to the "privately owned" heifers.

On the other hand, the flexibility and economic grasp displayed by the farm leaders in this matter are still not considered adequate by the financiers.

There is no need for studying and proposing. Rather, it is much more simple to select, by way of a call to action, precisely that document in which an interesting experiment appears as a violation of financial discipline.

But indeed the arrangement is of advantage to both the workers and the state and if it happens to conflict with the instruction, then perhaps the instruction should be changed rather than terminating an interesting experiment. In this particular instance, we are not so much interested in having the sovkhos break the law as we are determined to ensure that interesting initiative is not suppressed.

An examination of this problem by the financial organs of USSR Gosbank must include a keen and interested analysis of the new initiative, its virtues and shortcomings and the opportunities for further dissemination on an extensive scale.

AGRO-ECONOMICS AND ORGANIZATION

LEGAL ASPECTS OF MILK PROCUREMENT FROM POPULATION

Moscow SEL'SKAYA ZHIZN' in Russian 24 Jun 80 p 4

[Article by V. Kozhevnikov, director of the administration of economics and organization of the Main Administration of Animal Husbandry of the USSR Ministry of Agriculture: "The Procurement of Milk Surpluses"]

[Text] "Tell us, please, what is the system for procuring milk from the population?" asks S. Lokotov of Kaluzhskaya Oblast.

Enterprises of the milk industry voluntarily procure commodity surplus milk from the private enterprises of kolkhoz farmers, workers and employees who privately own cows. The procurement system is as follows:

--Contracts are made with kolkhozes, sovkhoses and other state enterprises which receive the milk from the population and deliver it to industrial reception points;

--Citizens deliver the milk directly to milk plants and their reception points;

--Milk is procured through a network of permanent and seasonal points, state and non-state collectors of milk of enterprises in the milk industry.

In kolkhozes and sovkhoses milk is received by collectors selected by them, in special facilities outside the territory of milk farms.

As a rule, the state procures only whole milk from the population and only in exceptional cases is it possible to sell home-made animal butter.

Enterprises of the dairy industry allocate milk flasks to kolkhozes, sovkhoses and other state enterprises for temporary use and also provide these enterprises with milk measurement equipment, strainers, filtration materials, cleaning and disinfection means, laboratory equipment, blank documentation that is required for the reception of milk from the population and for its delivery to reception points.

The quality of the milk is determined by the fat content of the average preserved sample. Other qualitative indicators are determined if there is any doubt about the milk's freshness and naturalness.

The enterprises of the dairy industry must pay for the milk procured from the population no less frequently than twice per month after determining the fat content. The procurement prices that are in effect at the place of delivery-reception are used, without reimbursement for transportation expenditures of the citizens-deliverers.

Monetary accounts with citizens who deliver milk directly to dairy plants and to their reception points are organized through the cashiers of the enterprises of the dairy industry; with the reception of milk by the collectors of kolkhozes and sovkhoses--through the cashiers of these enterprises.

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UKRAINIAN EXPERIENCE IN MILK PROCUREMENT STUDIED

Moscow ZAKUPKI SEL'SKOKHOZYAYSTVENNYKH PRODUKTOV in Russian No 5, May 80
p 27

[Article by Ya. Kislitskiy, senior zootechnologist of the UkSSR Ministry of the Meat and Dairy Industry: "Initiative Brings Success"]

[Text] Early in the morning Ivan Prokof'yevich Bruenko hurries to the milk-reception point. There is already a line here. But receiver Galina Nikolayevna Karpova serves her clients quickly. Milk cans are filled one by one with fragrant warm milk. Each day the residents of the village of Pogreby, which is in Brovarskiy Rayon, Kiev Oblast, sell the state 1,150-1,300 kilograms of milk, or more than 5 liters per cow.

This is an average figure. During the pasture period, when the grasses are rich in proteins and vitamins, it is significantly higher. Many owners of cows sell the state 7-10 kilograms of milk per day, or 2,500-3,000 kilograms annually. Suppliers such as Ivan Bruenko, Sergey Uleshchenko and others sell 4,000-4,500 kilograms.

"Why should the milk go to waste?" says Ivan Prokof'yevich Bruenko. "My cow, for example, annually produces over 6,000 liters of milk. For domestic purposes we do not use even a third of this quantity. For this reason we sell the surplus to the state. The advantage is reciprocal."

In 1979 the family Bruenko sold the state the surplus from its private enterprise--4,700 kilograms of milk, for which it received 890 rubles. Sergey Uleshchenko received over 840 rubles for the milk he sold to the state.

All of this is the result of constant organizational and educational work among the population on the part of party, soviet and economic organs. Kolkhozes and sovkhozes, procurement organizations and state inspectorates on procurement and on the quality of agricultural products have taken on many responsibilities. They allocate pastures, coarse and succulent feeds and concentrates as privileges and improve the zoo-veterinary servicing of animals. They provide the necessary transportation to receive the milk.

Moral and material incentives have been introduced. Special bulletins are hung in the reception point to inform people about the course of sales of surplus milk to the state every 10 days. They include the quantity, quality and fat content of the milk that was sold as well as the sum that paid to the supplier for his product. Bulletins help to organize socialist competition among suppliers. The dairy plant finds the means for rewarding winners.

Uneasiness and a concern for people have given rise to a desire to seek out new resources for increasing the sale of surplus agricultural products. During the years of the 10th Five-Year Plan the private enterprises of 10 oblasts sold the state double the amount of milk as in the preceding five-year plan. This was achieved in Kiev, Zhitomirskaya, Chernigovskaya, Ternopol'skaya, Chernovitskaya, Khmel'nitskaya, Vinnitskaya, Volynskaya and a number of other oblasts.

The year 1979 was completed successfully in Zhitomirskaya Oblast. The plan for milk procurement was 160-175 percent completed by the people of Popel'nyanskiy, Berdichevskiy and Yemil'chinskiy rayons. Milk suppliers Yekaterina Kirillovna Yarosh, Petr Nikolayevich Shmetan of the village of Khodarkov, Popel'nyanskiy Rayon, sold over 6,000 liters of milk each.

Good results are achieved not only by individual owners of cows, but also by entire villages and village soviets. For example, over 3,600 quintals of milk as compared to the planned 991 were procured from the residents of the village of Ploskoye, Kremenetskiy Rayon, Ternopol'skaya Oblast last year. From each of 294 cows maintained by the citizens of the village 1,400 kilograms of milk were sold to the state. Suppliers such as Galina Stepanovna Lukashchuk and Valentina Filippovna Romanyuk have sold 5,700-6,600 liters.

In 1979 in the republic 58,800 tons (or 15.7 percent) more milk was procured from the population than in the preceding year. A certain amount of service in this has been rendered by the workers of procurement organizations of Ukrminmyasomolprom [Ukrainian SSR Ministry of the Meat and Dairy Industry]. We are striving to make the experience of the best accessible to all.

In the republic the ranks of those producing 4,000 and even 6,000 liters are growing. Among them are Yefim Ivanovich Kotelevich, Andrey Pavlovich Zhurilo of the village of Khutryanka of Akhtyrskiy Rayon in Sumskaya Oblast, Todokha Vasil'yevna Pogorelets and Lyudmila Petrovna Khomyak of the village of Manuil'skoye of Teofipol'skiy Rayon in Khmel'nitskaya Oblast, Bronislava Leonidovna Yampovskaya of the village of Maydan-Vervitskoye, Timofey Yakovlevich Ponomarenko of the village of Rudnyanka of Letichevskiy Rayon in the same oblast and others who sold the state 4,000-6,000 liters of milk annually from their private enterprises.

The workers of the procurement system are striving to set up points for the reception of surplus milk in every village. In this they are being given practical aid by local party, soviet and economic organs. For example,

last year in Poltavskaya Oblast alone 211 such points were opened. In the republic as a whole their network has increased by almost 10 percent as compared to 1978.

This does not mean that all reserves for increasing milk procurement from the population have been exhausted. In private enterprises there are over 2,600,000 cows. However, surplus milk is sold to the state by only 50 percent of the cow owners. There are many reasons for this. In some villages there are no points for milk reception. In others they are in operation but with violations because there is an absence of milk hardware and transportation. In some rayons there are no state milk procurers.

All of these problems require immediate solutions since a growth in the procurement of milk surpluses from the population will encourage improved supplies, and this is one of the most important goals established by the November 1979 Plenum of the CPSU Central Committee and our ministry as well must work toward this goal.

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DEVELOPMENT OF AGROINDUSTRIAL ASSOCIATIONS IN KAZAKHSTAN

Alma-Ata SEL'SKOYE KHOZYAYSTVO KAZAKHSTANA in Russian No 5, May 80
pp 17-18

[Article by Ye . Dzherembayev, first deputy minister of the food industry of Kazakhstan, candidate of economic sciences, Honored Agronomist of the Kazakh SSR: "Agroindustrial Associations in Action"]

[Text] The July 1978 Plenum of the CPSU Central Committee observed that concentration of production and specialization of farms joined into independent sectors create broad opportunities for introducing scientific-technical advances and raising labor productivity at each farm. In recent years the enterprises of the republic Ministry of Food Industry have done a great deal toward regionalization and specialization of grape-growing on the basis of rational use of the natural and economic resources of particular regions and farms. Concentration is going forward on a broad scale based on interfarm cooperation and the formation of large grape-growing sovkhozes. The assortment of plantations is improving and the level of farming practices in raising grapes is rising.

Agroindustrial complexes began to be established within our ministry's system more than 20 years ago. At the present time agroindustrial integration in the grape-growing industry is carried on within the system of the Kazvinprom [Kazakh Grape Industry] Agroindustrial Association. This association includes 25 fruit and grape sovkhozes and four secondary winemaking plants as well as the Alma-Ata Production Association of Winemaking Enterprises. Twenty-two fruit and grape sovkhozes (sovkhoz-plants) have established primary winemaking subdivisions. Twenty-three fruit and grape storage units have been built at 15 sovkhozes for winter storage of fresh grapes and fruit. They have a total capacity of 31,000 tons.

The association always maintains close ties among the processes of raising agricultural output, selling it in fresh form, winter storage, industrial processing for juice and wine material, and production of finished wine. The waste from primary winemaking is used extensively

to make lime tartrate, grape oil, dried apple residue for pectin, and also as livestock feed. In this respect the association is a no-waste production system.

In the first three years of the 10th Five-Year Plan the average annual production of grapes went over 100,000 tons as compared to 79,500 tons in the Ninth Five-Year Plan. The average annual gross harvest of fruit in this same period more than doubled. As the result of introduction of scientific advances and progressive practices and raising the level of scientific farming the yield of the vineyards rose from 60.7 quintals per hectare (the average for the Ninth Five-Year Plan) to 77.6, while the fruit yield increased from 45.5 to 76.6 quintals per hectare.

The average annual net profit for the first three years of the current five-year plan was roughly 36,600,000 rubles compared to 26,398,000 rubles in the Ninth Five-Year Plan. The profitability of agricultural production at the specialized sovkhoses in 1976-1978 was 39.1 percent overall, which included 25 percent for fruit growing and 54 percent for grape growing. The sovkhoses of Kazvinprom now produce 85-90 percent of all grapes and about 60 percent of the fruit raised by the state sector in the republic.

In view of the positive experience of the agroindustrial grape growing associations, it was decided to carry out the same work in relation to raising and processing vegetables. Thus, almost five years ago the Taldy-Kurgan Agroindustrial Association was formed on the basis of a fruit canning plant and subsidiary farm. At the present time the Taldy-Kurgan fruit canning sovkhos-plant is a territorial production association for the production and processing of fruit and vegetables.

The production capacity of the fruit canning plant is 36.8 million standard cans of fruit and vegetables. The sovkhos-plant has 2,120 hectares, of which 2,078 is agricultural land and 982 has irrigation. The farm has planted 742 hectares of its arable land in grain crops, 105 in feed, 40 in potatoes, and 663 hectares in vegetables. Three divisions work in plant growing. The livestock sector has cattle, hogs, and poultry.

Formation of the Taldy-Kurgan sovkhos-plant offered a possibility of using raw material and labor resources more rationally to increase the production of output, expand its assortment, and improve quality while also raising the collective's overall interest in the final results of its labor.

The sovkhos-plant is still in the stage of stabilizing forms of work and organization of planning. The results of the activity of the complex already illustrate, however, that this is a progressive way of joining the canning industry and vegetable production. The efficiency of the economic activities of this agroindustrial association speaks

for itself. The prime cost of a quintal of output (vegetables) has dropped by 49 kopecks in the last three years. Expenditures to produce commodity output have decreased by almost two rubles. Vegetable production is up 8,726 tons and yield has risen by 83.3 quintals per hectare [sic]. This has enabled the collective of the plant to greatly increase the quantity and quality of canned fruit and vegetables.

Moreover, the activities of the sovkhos-plant demonstrate in practice that the formation of such associations, where the interests of agricultural and industrial workers are interrelated, is extremely wise from both an economic and a production point of view. This agro-industrial association has made it possible to use labor resources and the fleet of motor vehicles and tractors more efficiently. In the spring plant workers help plant the vegetables, and in the summer they help with weeding and the harvest. In the autumn and winter workers from the sovkhos help the plant process the vegetables. As a result, all the employees of the association have year-round work. Whereas industrial production formerly did not have enough vegetables for work in the fall and winter and had to buy them and their semifinished products outside the oblast (and even outside the republic), today the planned raw material requirement is met almost 100 percent. The delivery of raw material to the plants in the proper assortment has also stabilized, which has eliminated sorting costs and vegetable loss during the time of large-scale processing.

Work on further concentration and specialization of farms is going forward successfully at sovkhoses of the Ministry of Food Industry. Thus, of our 23 sovkhoses six have more than 1,500 hectares of perennial plantations, five have 1,200-1,500 hectares, two have 1,000-1,200 hectares, five have 700-1,000 hectares, and just seven sovkhoses have less than 700 hectares of plantations. Three of them are fruit nursery farms. According to the long-range plans for development of Kazvinprom sovkhoses, there will be 31,000 hectares of perennial plantations by 1990, which is an average of about 1,400 hectares per farm (excluding the fruit nurseries). This will provide the optimal level of specialization. Gross production of fruit, grapes, and berries is to be raised to 233,400 tons by 1990. This is an increase of 73,400 tons above the average level achieved in the 10th Five-Year Plan.

To step up the process of intensification of orchard farming and grape growing in the Kazakh SSR, furtherance of specialization at existing farms, and increasing production of grapes, fruit, and vegetables it is also essential to solve the problem of organizing new sovkhos-plants, especially in the new lands of Chimkentskaya and Alma-Atinskaya oblasts.

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TILLING AND CROPPING TECHNOLOGY

MEASURES AGAINST LEAF RUST, POWDERY MILDEW IN TATAR ASSR

Saratov STEPNIYE PROSTORY in Russian No 5, May 80 pp 38-39

[Article by Kazan' Agricultural Institute Docent A. M. Romanova and Agronomists Kh. Z. Valiyev and T. Z. Akhmayev: "Measures Against Leaf Rust and Powdery Mildew"]

[Text] One of the most damaging diseases to wheat in the Tatar ASSR is leaf rust, which has spread almost everywhere since 1968 and caused extensive damage to crops.

For reducing the amount of damage done by this disease measures which exert a direct influence on the plant itself to enhance its resistance through chemotherapy become important. One such measure is foliar application of microelements during the growing season. It serves to shift the character and level of metabolism, thereby disrupting the pathogen's customary habitat.

The effect which microelements in foliar application have on enhancing the plants' resistance to diseases depends on the number of applications. When the microelements are applied to the surface of the leaves, assimilation of them by the plant does not last long, from the time of application until the solution dries. Subsequently the assimilation may resume, if the dry residue is moistened by dew or a light rain, but heavy rains may wash the microelement salts from the leaves and reduce their effectiveness.

We investigated the effectiveness of a 0.02 percent concentration of copper in mixtures with 0.015 percent boron, manganese, and zinc in foliar application in the ontogenesis of Saratovskaya-29 and Saratovskaya-36 spring wheat to control leaf rust and powdery mildew. The plants were sprayed with compounds of copper, manganese, and zinc sulfates and boric acid at the rate of 1.5 grams each and copper sulfate at the rate of 2 grams per 10 liters of water at pressures of 5 to 6 atmospheres with a portable sprayer up to 1,000 liters per hectare at intervals of 7 to 10 days 3 times: the phenophases tillering-stooling, stooling, and heading (on the Kazan' Agricultural Institute Training Farm) and 2 times during

the heading and milky ripeness phases (on Privolzh'ye Kolkhoz, Zelenodol'skiy Rayon, Tatar ASSR).

The field experiments were set up on the Agricultural Institute's training farm on soddy-podzolic, sandy loam soil with high phosphorus levels (30 milligrams per 100 grams of soil) and low levels of potassium (4 to 8 milligrams) and a (Tyurin) humus content of 2.1 percent. The predecessor was oats. $N_{30}P_{30}K_{10}$ was applied during spring tilling. In 1975 the experiment was on soddy-podzolic, medium-loamy soil with average phosphorus levels (18.9 milligrams per 100 grams of soil) and low potassium (6.6 milligrams) and (Tyurin) humus content of 1.4 percent. The predecessor was green fodder corn. $N_{50}P_{10}K_{25}$ was applied during spring tilling, and during the seedling phase foliar application was carried out with nitrophoska at the rate of 140 kilograms per hectare. Cultivation of the soil consisted of fall plowing to 20 to 24 centimeters, spring harrowing and cultivation to 8 to 10 centimeters, and packing with ring rollers; drill seeding was carried out with a sowing norm of six million seeds per hectare.

On Privolzh'ye Kolkhoz, the field experiments were conducted on dark-gray wooded steppe medium-loamy soil with average levels of nitrogen and potassium and high levels of phosphorus. The predecessor was winter wheat. Cultivation consisted of fall plowing to 25 to 28 centimeters, two spring harrowings, and cultivation to 10 to 12 centimeters with simultaneous application of ammonia water at the rate of 1.5 quintals per hectare. Drill planting was carried out with a sowing norm of six million seeds per hectare.

Agroecological conditions during the years of the investigations were difficult and unfavorable to the growth and development of spring wheat (either too dry or too wet and cold during particular phenophases).

The investigations revealed that under arid conditions unfavorable to the growth and development of spring wheat, copper and mixtures of it with boron, manganese, and zinc exerted a powerful stimulative and intraplant therapeutic effect on the condition of the plants and growth processes, an effect which lasted to the end of the growing stage. The experimental plants produced a more vigorous biomass in all organs, especially the heads and leaves, which had a better ratio and greater area of healthy green leaves--1.7 to 3.0 fold greater than the control. The total photosynthesis area of the leaves was consistently greater (1.3 to 1.5 times) than the control prior to the harvest.

The greatest differences in the growth of the control versus the experimental plants were observed in the heading phase, when leaf rust developed. The area of healthy green leaves in the microelement variants exceeded the control by a factor of 1.6, 2.2 and 3.0, while the area of green leaves infected with rust decreased to five-sixth, five-eighths, and ten-nineteenths. This was due to the higher level of metabolism in all organs of the experimental plants, in which the dry matter increased by 1.6, 3.8, and 7.3 percent in the leaves and 2.5 to 3.7 percent in the head.

The microelements substantially increased the wheat's resistance to leaf rust, which developed on a natural infestation background, Fungus Race 77. The disease began to develop at the stooling phase on 9 June, mild infestation, two to five pustules per plant. The greatest spread was observed during the milky ripeness phase, a period of heavy rains, and a new generation of uredospores appeared, after six to seven days of fungus incubation, when the intensity of the infestation averaged 25.8 percent in the control plants but only 14.2 percent in the microelement variants--1.8 times less. The intensity of infestation varied dramatically at particular leaf levels. The greatest infestation was noted on the first leaf under the head. It was 9.2 percent infested as against 14.1 percent on the control--milder by a factor of 1.5.

In the variant with mixtures of microelements, the second and third leaves were also less severely infested. The intensity of infestation was ten sevenths to one-half as much as the control. The greatest infestation occurred on the third leaf of the control--37 percent, or 2.6 fold more severe than the first leaf. This is due to the fact that circulation is poor at the third level, drop and liquid moisture lasts longer, and the age-based resistance of the tissues is much lower. In the development of the disease, the number of infections more than doubled in eight days of fungus incubation--by 14 June. The leaves on the lower levels (third and second) of the control were completely infected, yellowed, and withered. On the experimental plants, the second leaf was still yellowish-green and alive and continued assimilating. The intensity of infestation of the first leaf on the control increased by 16.3 percent (twofold) during the milky-waxy ripeness phase and reached 30.4 percent. In the variant with microelements it increased by 4.5 percent and reached only 13.7 percent (mild infestation). The technical effectiveness of the microelements on Saratovskaya-29 during the milky ripeness phase was 45 percent. During the milky-waxy ripeness phase it varied proportionally to the reduction in intensity of infestation of the leaves by levels from 35.8 to 51.0 percent.

On Privolzh'ye Kolkhoz, leaf rust infected 30.2 percent of the control plants. Especially severely affected was the third leaf under the head--up to 50.2 percent. Copper and mixtures of it with boron, manganese, and zinc reduced the infestation to five-forty-sixths to ten seventy-sevenths and practically halted the development of the rust. The intensity of infestation of the whole plant was only 3.3 to 3.9 percent (beginning of infection), while the first and second leaves were 1.6 to 3.5 infected. Thus, triple spraying of the plants by phenophases increased their resistance to leaf rust and sharply reduced its damage to the plant. The enhanced resistance to the disease was due to an overall improvement in the plants' condition under the influence of copper and mixtures of it with boron, manganese, and zinc, an effect which lasted to the end of the growing stage.

Phytopathological observations have revealed that in the Tatar ASSR powdery mildew develops almost in parallel with leaf rust, appearing three to four days earlier. In 1975, powdery mildew appeared for the first time on 11 June during the heading phase on the lower yellowish-green leaves of the control plants, with an infestation intensity of 25 percent. Copper and mixtures of microelements caused a sharp decline in the intensity of powdery mildew infestation. It was only 4.7 to 6.2 percent, or 5.7 to 7.5-fold milder than the control. With this mild infestation, the disease went into a decline. Copper and mixtures of it with boron, manganese, and zinc practically halted the development of the disease and enhanced the plants' immunity. In analyzing the resistance of various leaves to the powdery mildew, it is clear that the third leaf under the head was the worst infected--58.7 percent. Just as in the development of leaf rust, the least affected was the first leaf under the head. The technical effectiveness of copper and microelement mixtures against powdery mildew is very high--83.8 to 86.7 percent.

With foliar application, microelements enhanced spring wheat's growth processes and phytoimmunity to leaf rust and powdery mildew and also promoted plant vigor and increased crop yields. Over the years, crop yield gains varied between 2.7, 2.3, and 1.9 quintals per hectare, or 17.4, 23.7, and 19.0 percent compared with the control. The average crop yield gain over the three years was 2.3 quintals per hectare, or 20.3 percent. The increase in the spring wheat crop yields was due to better head productivity. Heads were 1.72 centimeters longer than the control, contained 3.8 more grains, and grains weighed 0.1 grams more. The yield gain from copper alone was 2.1 quintals per hectare, or 21 percent. In the dry years, the effectiveness of copper was not inferior to mixtures of copper with boron, manganese, and zinc.

The microelements improved the quality of the grain, especially its size and protein content. In Saratovskaya-29, the mass of 1,000 grains increased by 2.5 grams, weight increased by 17.0 grams per liter, raw gluten increased by 4 percent, and protein by 1.9 percent. Saratovskaya-36 was distinguished by larger grains in the microelement variant: the mass of 1,000 grains exceeded the control by 4.75 grams, the weight by 20 grams per liter, raw gluten increased to 35.04 versus 30.0 percent, and protein to 16.70 versus 14.25 percent in the control, especially when sprayed with copper alone. This is due to the stronger effect which copper has on the plants' enzyme activity.

Foliar application of microelements to combat leaf rust and powdery mildew is economically beneficial. The rate of application of each microelement in the form of copper, manganese, and zinc sulfates and boric acid in ground spraying is 150 grams per hectare, while copper alone is 200 grams per hectare. Additional outlays in triple spraying with microelement mixtures came to an average of 3.83 rubles per hectare over the three-year period, while copper alone was 1.93 rubles per hectare. The resulting net income was 22.6 rubles per hectare at a purchase price of 11.8 rubles per quintal--that is, one ruble of additional outlays yielded 5.9 rubles in profit.

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